



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/791,927	03/02/2004	Matthew J. Carey	HSJ920030268US1	3829

44425 7590 04/19/2006

THOMAS R. BERTHOLD  
18938 CONGRESS JUNCTION COURT  
SARATOGA, CA 95070

EXAMINER

KAYRISH, MATTHEW

ART UNIT	PAPER NUMBER
----------	--------------

2627

DATE MAILED: 04/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/791,927	CAREY ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Matthew G. Kayrish	2627	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 02 March 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4-15, 17-21 is/are rejected.
- 7) ☒ Claim(s) 3 and 16 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>4/5/2006</u> .  | 6) <input type="checkbox"/> Other: _____                                    |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Kamijo (US Patent Number 6819532) and Baumgart (US Patent Number 5287238).
3. Regarding claim 1, Kamijo et al disclose:

An antiferromagnetically exchange-coupled structure in a magnetic device of the type having a substrate and a plurality of ferromagnetic layers, the structure being formed on the substrate and comprising:

An underlayer (figure 2, item 11) formed of a substantially chemically-ordered alloy having a tetragonal crystalline structure, the alloy selected from the group consisting of alloys of AuCu, FePt, FePd, AgTi<sub>3</sub>, Pt Zn, PdZn, IrV, CoPt and PdCd (column 3, lines 30-31 (these alloys are tetragonal));

An antiferromagnetic layer in contact with the underlayer (figure 2, item 12) and formed of a substantially-chemically-ordered alloy comprising X and Mn and having a tetragonal crystalline structure, wherein X is selected from the group consisting of Pt, Ni, Ir, Pd and Rh (column 21, line 67); and

A pinned ferromagnetic (figure 2, item 13) layer exchange-coupled with the antiferromagnetic layer (column 13, lines 12-15).

Baumgart et al disclose:

An antiferromagnetically exchange-coupled structure in a magnetic device of the type having a substrate and a plurality of ferromagnetic layers, the structure being formed on the substrate and comprising:

An underlayer (figure 10, item 57) formed of a substantially chemically-ordered alloy having a tetragonal crystalline structure, the alloy selected from the group consisting of alloys of AuCu, FePt, FePd, AgTi<sub>3</sub>, Pt Zn, PdZn, IrV, CoPt and PdCd (column 8, lines 53-60 (these alloys are tetragonal));

An antiferromagnetic layer in contact with the underlayer (figure 10, item 59) and formed of a substantially-chemically-ordered alloy comprising X and Mn and having a tetragonal crystalline structure, wherein X is selected from the group consisting of Pt, Ni, Ir, Pd and Rh (column 8, line 53-60 (indicates FeMn can be used)); and

A pinned ferromagnetic (figure 10, item 61) layer exchange-coupled with the antiferromagnetic layer (column 6, lines 15-20).

4. Claim 6 is rejected under 35 U.S.C. 102(b) as being anticipated by Kamijo.
5. Regarding claims 6 and 19, Kamijo discloses:

The head of claim 12 wherein the underlayer alloy comprises Au and Cu and the antiferromagnetic alloy comprises Pt and Mn (column 3, lines 40-44).

6. Claims 9-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Baumgart
7. Regarding claim 9, Baumgart et al disclose everything repeated from claim 1, further disclosing:

A pinned ferromagnetic layer exchange-coupled with the antiferromagnetic layer and having a magnetization direction oriented substantially perpendicular to the plane of the recording medium (figure 9, arrows 42 & 49) and substantially prevented from rotating in the presence of magnetic fields from the recording medium (column 5, lines 47-52);

A free ferromagnetic layer (figure 10, item 65) having a magnetization direction oriented substantially parallel to the plane of the recording medium in the absence of an external magnetic field (figure 9, arrow 44), said free layer magnetization direction being substantially free to rotate in the presence of magnetic fields from the recording medium (column 5, lines 47-52); and

A nonmagnetic spacer layer between the pinned ferromagnetic layer and the free ferromagnetic layer (figure 10, item 63).

8. Regarding claim 10, Baumgart et al disclose:

The head according to claim 9 wherein the free layer is located between the substrate and the exchange-coupled structure (figure 10, item 65 is between items 61 & 69 therefore within the exchange coupled structure).

9. Regarding claims 11, 12, 13 and 14, Baumgart et al disclose:

The head according to claim 9 wherein the head is a current-parallel/perpendicular-in-the-plane head having the sense current directed substantially

parallel/perpendicular to the plane of the free layer (figure 10, current source will provide sense current in a loop which will cover both perpendicular and parallel currents to the free layer).

The head according to claim 12 wherein the head is a spin-valve/magnetic tunnel junction head (column 4, lines 59-64) and wherein the nonmagnetic spacer layer is electrically conducting/electrically insulating tunnel barrier (column 8, line 40 (metallic spacer indicates electrically conducting)).

Claim 14 rejected for the same reason as claim 13, since back-to-back contradicting claims (electrically conducting/electrically-insulating) are not relevant to the claimed invention.

***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamijo or Baumgart et al., in view of Fuzukawa (US Publication Number 2002/0048690).

12. Regarding claims 2 and 15, Kamijo or Baumgart et al fail to disclose:

The structure of claim 1 further comprising a seed layer consisting essentially of Ru or Rh, the underlayer being located on the seed layer.

Fuzukawa et al disclose:

The structure of claim 1 further comprising a seed layer consisting essentially of Ru or Rh, the underlayer being located on the seed layer (page 19, paragraph 260).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the seed layer out of Ru or Rh, since these films are alloy or laminate films, which help increase the function of the antiferromagnetic film.

13. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamijo or Baumgart et al., in view of Tanogami (JP Publication Number JP 2000251226 A).

14. Regarding claims 4 and 17, Kamijo or Baumgart et al. fail disclose:

The head of claim 12 wherein the antiferromagnetic alloy further comprises one or more of Cr, Pt, Pd, V, and Ni.

Tanogami discloses:

The head of claim 12 wherein the antiferromagnetic alloy further comprises one or more of Cr, Pt, Pd, V, and Ni (Abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to fabricate an antiferromagnetic layer of this material, as this material can improve corrosion resistance and increase resistance.

15. Official notice is taken regarding claims 5 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamijo and Baumgart.

16. Regarding claims 5 and 18, Kamijo et al disclose:

The head of claim 12 wherein the first element listed in each underlayer alloy in the group is present in the alloy in amount between approximately 35 and 65 atomic percent (column 3, line 30 (CuAu is understood to be 50/50, since it isn't subscripted otherwise)).

Baumgart et al disclose:

The head of claim 12 wherein the first element listed in each underlayer alloy in the group is present in the alloy in amount between approximately 35 and 65 atomic percent (column 8, line 58 (AuCu is understood to be 50/50, since it isn't subscripted otherwise)).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, in the course of routine engineering optimization/experimentation to create the alloy having a ratio within this range. Moreover, absent a showing of criticality, i.e., unobvious or unexpected results, the relationships set forth in claims 5 and 18 are considered to be within the level of ordinary skill in the art.

Additionally, the law is replete with cases in which the mere difference between the claimed invention and the prior art is some range, variable or other dimensional limitation within the claims, patentability cannot be found.

It furthermore has been held in such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range(s); see *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).



Moreover, the instant disclosure does not set forth evidence ascribing unexpected results due to the claimed dimensions; see *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338 (Fed. Cir. 1984), which held that the dimensional limitations failed to point out a feature which performed and operated any differently from the prior art.

17. Official notice is taken regarding claims 7, 8, 20 and 21 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamijo.

18. Regarding claims 7, 8, 20 and 21, Kamijo disclose:

The head of claim 19 wherein the thickness of the PtMn alloy antiferromagnetic layer is less than approximately 125 Angstroms (columns 4 and 5, lines 67 and 1-4).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, in the course of routine engineering optimization/experimentation to fabricate the MR sensor with layers of thickness in these ranges. Moreover, absent a showing of criticality, i.e., unobvious or unexpected results, the relationships set forth in claims 7, 8, 20 and 21 are considered to be within the level of ordinary skill in the art.

Additionally, the law is replete with cases in which the mere difference between the claimed invention and the prior art is some range, variable or other dimensional limitation within the claims, patentability cannot be found.

It furthermore has been held in such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range(s); see *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Art Unit: 2627

Moreover, the instant disclosure does not set forth evidence ascribing unexpected results due to the claimed dimensions; see *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338 (Fed. Cir. 1984), which held that the dimensional limitations failed to point out a feature which performed and operated any differently from the prior art.

19. Claim 15 is rejected under 35 U.S.C. 103(a) as being anticipated by Baumgart, in view of Fuzukawa.

20. Claim 15 rejected for the same reasons as claim 2.

21. Claim 17 is rejected under 35 U.S.C. 103(a) as being anticipated by Baumgart, in view of Tanogami.

22. Claim 17 is rejected for the same reasons as claim 4.

23. Claim 18-21 is rejected under 35 U.S.C. 103(a) as being anticipated by Baumgart, in view of Kamijo.

24. Claim 18 is rejected for the same reason as claim 5.

25. Claim 19 is rejected for the same reason as claim 6.

26. Claims 20 and 21 are rejected for the same reasons as claims 7 and 8.

*Allowable Subject Matter*

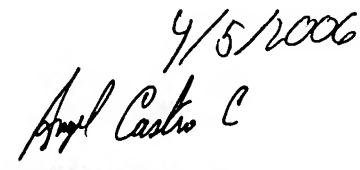
27. Claims 3 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
28. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew G. Kayrish whose telephone number is 571-272-4220. The examiner can normally be reached on 8am - 5pm M-F.
29. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Korzuch can be reached on 571-272-7589. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.
30. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Matthew Greco Kayrish

4/5/2006

MK



4/5/2006  
  
ANGEL CASTRO  
PRIMARY EXAMINER